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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/707,805	01/13/2004	Yi-Nan Chen	NTCP0027USA	1804
27765	7590	09/08/2005	EXAMINER	
NORTH AMERICA INTELLECTUAL PROPERTY CORPORATION P.O. BOX 506 MERRIFIELD, VA 22116			GEBREMARIAM, SAMUEL A	
			ART UNIT	PAPER NUMBER
			2811	

DATE MAILED: 09/08/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/707,805

Applicant(s)

CHEN ET AL

Examiner

Samuel A. Gebremariam

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 24 June 2005.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-18 is/are pending in the application.
- 4a) Of the above claim(s) 9-18 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-8 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 6/24/05
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

## **DETAILED ACTION**

### ***Request for Continued Examination***

1. A request for continued examination (RCE) under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 08/10/01 has been entered. An action on the RCE follows.

2. The amendment filed on 6/24/2005 has been entered.

### ***Claim Rejections - 35 USC § 102***

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

4. Claims 1-3 and 7-8 are rejected under 35 U.S.C. 102(e) as being anticipated by Lee, US patent No. 6,514,816.

Regarding claim 1, Lee teaches (figs. 2A-2F) an isolation structure (260) of a trench capacitor (col. 3, lines 13-16), the trench capacitor being disposed in a deep trench (210) of a substrate (200) and comprising: a storage node (225) serving as a top

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plate of the capacitor in the deep trench (210); a bottom plate buried (221) in the substrate around the deep trench (210); a capacitor dielectric layer (223) positioned between the storage node (225) and the bottom plate (221), on a sidewall of the deep trench, the storage node (225) the bottom plate (221) and the capacitor dielectric (223) forming storage capacitance; and a collar oxide layer (227) disposed on the sidewall of the deep trench, the isolation structure (260) comprising (fig. 2F): a first isolation portion (portion of 260 that is overlapping the dip trench 210) directly contacting and completely covering the top surface of the storage node to separate and isolate the storage node from other conductive elements (element 270 right above region the first isolation region) positioned above the storage node (refer to fig. 2F), the first isolation portion completely filling a top opening of the deep trench and, having a first thickness (refer to fig. 2F, where the first thickness is the thickness where the overlapping portion of 260 and the portion of 260 that does not overlap the deep trench intersect); and a second isolation portion (portion of 260 that does not overlap the deep trench) directly contacting the first isolation portion (refer to fig. 2F) and surrounding the deep trench without overlapping the deep trench (refer to fig. 2F), the second isolation portion having a second thickness larger than the first thickness, the second isolation portion directly contacting and positioned beside and adjacent to both a top portion of the storage node and a top portion of the collar oxide layer (227, refer to fig. 2F).

Regarding claim 2, Lee teaches the entire claimed structure of claim 1 above including the second isolation portion is disposed by a side of the collar oxide layer

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(227), near the storage node (225) and the collar oxide layer (227) without being located on the storage node (225) and the collar oxide layer (227, fig. 2F).

Regarding claim 3, Lee teaches the entire claimed structure of claim 1 above including that a bottom of the second isolation portion is lower than a top of the top portion of the collar oxide layer it contacts (refer to fig. 2F).

Regarding claims 7 and 8, Lee teaches the entire claimed structure of claim 1 above including the first isolation portion and the second isolation portion are oxide layers (col. 4, lines 35-44).

The limitation of "the first isolation portion and the second isolation portion are oxide layers formed by a high density plasma chemical vapor deposition (HDPCVD) process" is considered a product-by-process claim. "[E]ven though product-by process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process." *In re Thorpe*, 777 F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985).

### ***Claim Rejections - 35 USC § 103***

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 4-6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lee in view of Alsmeier US patent No. 5,867,420.

Regarding claim 4, Lee teaches substantially the entire claimed structure of claim 1 above except explicitly stating the isolation structure further comprising an isolation liner disposed between the first isolation portion and the conductive layer, the second isolation portion and the conductive layer, and the second isolation portion and the collar oxide layer.

Alsmeier teaches the use of liner structure (fig. 2d, liner 255, and col. 4, lines 45-62) in the formation of an isolation structure in a trench capacitor.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the liner structure taught by Alsmeier in the device of Lee in order to prevent oxygen diffusion.

The combined structure of Lee and Alsmeier would inherently teach the isolation structure having an isolation liner disposed between the first isolation portion and the conductive layer, the second isolation portion and the conductive layer, and the second isolation portion and the collar oxide layer.

Regarding claim 5, Lee teaches substantially the entire claimed structure of claim 1 above including the isolation liner comprises a nitride liner (col. 4, lines 45-62).

Regarding claim 6, Lee teaches substantially the entire claimed structure of claim 1 above including the isolation liner comprises an oxide liner (col. 4, lines 45-62).

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***Response to Arguments***

7. Applicant's arguments with respect to claims 1-8 have been considered but are moot in view of the new ground(s) of rejection.

***Conclusion***

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Samuel A. Gebremariam whose telephone number is (571) 272-1653. The examiner can normally be reached on 8:00am-4:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Steve Loke can be reached on (571) 272-1657. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

SAG  
September 4, 2005

Steven Loke  
Primary Examiner  
